

**CLAIMS****WHAT IS CLAIMED IS:**

- 1        1. A kit for determining whether a subject has, or is at risk of developing, colorectal cancer  
2        wherein said kit is used to amplify and/or determine the molecular structure of at least a  
3        portion of the MnSOD gene.
- 1        2. The kit of claim 1 further comprising a first and second oligonucleotide specific for SEQ  
2        ID NO: 1.
- 1        3. The kit of claim 2 wherein said first and second oligonucleotides can be used to produce a  
2        polynucleotide comprising a region of the MnSOD gene, said region including nucleotide  
3        residue 351 of SEQ ID NO:1.
- 1        4. The kit of claim 2, wherein the oligonucleotides have a nucleotide sequence from about 15  
2        to about 30 nucleotides.
- 1        5. The kit of claim 2, wherein the first and second oligonucleotides are labeled.
- 1        6. The kit of claim 2, wherein the first oligonucleotide is specific for the MnSOD Ala allele  
2        and the second oligonucleotide is specific for the MnSOD Val allele.
- 1        7. The kit of claim 1 further comprising one or more oligonucleotide probes specific for the  
2        MnSOD Ala allele and the MnSOD Val allele.
- 1        8. The kit of claim 7 wherein said probes are detectably labeled.
- 1        9. The kit of claim 8 wherein said probes are fluorescently labeled.
- 1        10. The kit of claim 9 wherein said probes are labeled with a quenching molecule.
- 1        11. The kit of claim 7 wherein said probes are bound to a surface.
- 1        12. The kit of claim 1 further comprising an allele specific endonuclease.

- 1 13. A method for determining whether a subject has, or is at a risk of developing, colorectal  
2 cancer comprising determining the identity of the allelic variant of the MnSOD gene in a  
3 nucleic acid obtained from the subject.
- 1 14. The method of claim 13 further comprising contacting the subject's sample nucleic acid  
2 comprising the MnSOD gene with a probe or primer which hybridizes to the polymorphic  
3 region of the mitochondrial targeting sequence of the MnSOD gene, said polymorphic  
4 region including nucleotide 351 of SEQ ID NO:1.
- 1 15. The method of claim 13, wherein determining the identity of the allelic variant comprises  
2 determining the identity of at least one nucleotide of the polymorphic region.
- 1 16. The method of claim 13, wherein determining the identity of the allelic variant comprises  
2 performing a restriction enzyme site analysis.
- 1 17. The method of claim 13, wherein determining the identity of the allelic variant is carried out  
2 by single-stranded conformation polymorphism.
- 1 18. The method of claim 13, wherein determining the identity of the allelic variant is carried out  
2 by allele specific hybridization.
- 1 19. The method of claim 13, wherein determining the identity of the allelic variant is carried out  
2 by primer specific extension.
- 1 20. The method of claim 13, wherein determining the identity of the allelic variant is carried out  
2 by an oligonucleotide ligation assay.
- 1 21. The method of claim 13, wherein the MnSOD gene is a human MnSOD gene.
- 1 22. The method of claim 13, wherein the probe or primer has a nucleotide sequence from about  
2 15 to about 30 nucleotides.
- 1 23. The method of claim 13, wherein the probe or primer is labeled.
- 1 24. A method for determining risk of colorectal cancer in a subject, comprising the steps of:  
2 a. determining the base identity of a portion of genomic DNA from the subject's cell

3 sample, said genomic DNA comprising an MnSOD gene comprising a mitochondrial  
4 targeting sequence, said portion corresponding to position 351 as defined in SEQ ID  
5 NO:1 of said MnSOD gene in said mitochondrial targeting sequence; and  
6 b. correlating said base identity with a risk for colorectal cancer.

1 25. The method of claim 24; wherein the base identity of position 351 is determined by  
2 sequencing a portion of said mitochondrial targeting sequence of said MnSOD gene  
3 containing said position 351.

1 26. The method of claim 24; wherein base identity of said position 351 is determined by  
2 digesting said portion of the mitochondrial targeting sequence of said MnSOD gene with a  
3 restriction endonuclease appropriate to determine the base identity of said position 351.

1 27. The method of claim 24; wherein said base identity is determined by examining an RNA  
2 fraction from said subject's cell sample, whereby the identity of said genomic DNA at said  
3 position 351 can be determined.

1 28. The method of claim 24; wherein a risk for developing colorectal cancer is assessed to be  
2 greater than that of the unaffected relevant population when the base identity at said position  
3 351 is homozygous for C.

1 29. The method of claim 28; wherein the age of the subject is less than about 35 years.

1 30. The method of claim 29; wherein the ethnicity of the subject is Hispanic.

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